

WY02131

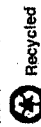
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Ref: 8P-W-GW

AUG = 3 2005

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Randy P. Meabon
Regulatory Coordinator
Marathon Oil Company
Rocky Mountain Oil Operations
1501 Stampede Avenue
Cody, WY 82414

Re: Approval to Rework and Modify
Tribal E-14 Enhanced Recovery Injection Well
Steamboat Butte Field, Fremont County, Wyoming
EPA Permit No. WY20829-02131

Dear Mr. Meabon:

My staff have received and reviewed your May 17, 2005 letter providing Marathon Oil Company's (Marathon) plan to modify the construction and completion of the above-referenced Class II enhanced recovery injection well. Marathon has proposed modifying the existing construction configuration of this injection well by removing the dual packer (straddle packer) assembly that presently isolates existing Nugget Formation perforations from 5,260 ft to 5,385 ft and recompleting the well with one packer set at 5,200 ft. This configuration would allow for injection into the Nugget Formation in addition to currently existing injection into the Phosphoria and Tensleep Formations from 6,567 ft to 6,290 ft. Marathon further requests that should the proposed enhanced oil recovery injection into the Nugget Formation not respond as anticipated, Marathon could, at it's discretion, return the well to the current dual-packer assembly configuration.

EPA has reviewed your request and determined that the proposed changes allow the well to continue to be operated in a manner such that underground sources of drinking water are protected. Further, the Nugget Formation is within the approved injection zone of the Permit Part II C.3. "Injection will be limited to the gross interval of the Nugget, Phosphoria and Tensleep Formations (5260' - 6920'). Therefore, EPA hereby approves this request to rework and modify the Tribal E-14 injection well according to the proposed plan, with further approval



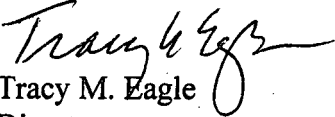
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to return the well to the current dual packer assembly configuration should such a change become necessary. Because the depth to the top injection perforation has become shallower, the Director has determined the new Maximum Allowable Injection Pressure (MAIP) for the Tribal E-14 injection well is 1404 psi.

In order to obtain authorization to resume injection, Marathon must submit an updated schematic of the current completion details of the well, a completed Well Rework EPA Form 7520-12 (enclosed) and the results from the successful Part I (Internal) Mechanical Integrity (MI) test including a chart recording of the test if not witnessed by an EPA representative. Please note that upon completion of all well rework involving the casing, tubing or annulus, Marathon must demonstrate that the well has reestablished Part I (Internal) mechanical integrity by passing a Standard Annulus Pressure Test (SAPT) mechanical integrity test.

If you have any questions concerning this approval, please contact Dan Jackson of my staff at (303) 312-6155.

Sincerely,


Tracy M. Eagle
Director
Ground Water Program

Enclosure (EPA Form 7520-12)

cc: Don Aragon, Director
Wind River Environmental Quality Commission
P.O. Box 217
Fort Washakie, WY 82514

United States Department of the Interior
Bureau of Land Management, Lander Resource Area
PO Box 589
Lander, WY 82520
Attention: Chief, Branch of Fluid Materials

The State of Wyoming Oil and Gas Conservation Commission
State Oil and Gas Supervisor
PO Box 2640
Casper, WY 82602

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 Marathon Oil Company
 Street, Apt. No., or PO Box No. 1501 Stampede Avenue
 City, State, ZIP+4 Cody, WY 82414-4721

PS Form 3800, January 2001 See Reverse for Instructions

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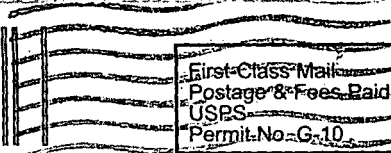
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102595-01-M-1049

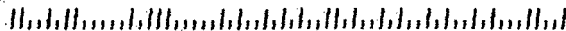
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Mail Code: 8P-W-GW
999 18th Street, Suite 300
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Dan Jackson





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 8
999 18TH STREET - SUITE 500
DENVER, CO 80202-2466

MAR 23 1999

Ref: 8P-W-GW

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. R.P.Meabon
Regulatory Coordinator
Marathon Oil Company
1501 Stampede Avenue
Cody, WY 82414-4721

RE: UNDERGROUND INJECTION CONTROL (UIC)
Minor Permit Modification - MIP
Tribal E-14 (WY2829-02131)
Steamboat Butte Field
Fremont County, Wyoming

Dear Mr. Meabon:

Thank you for your letter of February 18, 1999, and permit modification requests for the above-cited Underground Injection Control (UIC) Commingled Phosphoria/Tensleep injector. Your request to increase the maximum allowable pressure on the Tribal E-14 well from the previous Nugget, Phosphoria/Tensleep Formations has been reviewed and found to satisfactorily justify your requested permit modifications.

The Nugget perforations were squeezed with Class "G" cement and a sand frac was performed on the Upper Tensleep open hole. The well was returned to Phosphoria/Tensleep commingled injection after successfully performing a casing mechanical integrity test (MIT) with chart, October 21, 1998.

The injection pressure limitations were presented in the original permit application, dated June, 1997, and changes to the that permit are as follows:

PART II. C. 4 (b).

ORIGINAL VERSION:

4. Injection Pressure Limitation.



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- (b) The exact pressure limit may be **increased or decreased** by the Director in order to ensure that the requirements in paragraph (a) are fulfilled. In order to determine an exact pressure limit, the permittee shall conduct a step-rate injection test (SRT) or other authorized well test(s) that will serve to determine the fracture pressure (Pmax) of the injection zone. Test procedures shall be pre-approved by the Director. The Director will specify in writing, to the permittee, any increase or decrease to the injection pressure based on the test results and/or other parameters reflecting actual injection operations. Until such time that this demonstration is made, the initial maximum injection pressure (Pmax), measured at the surface, shall not exceed 1404 psig.

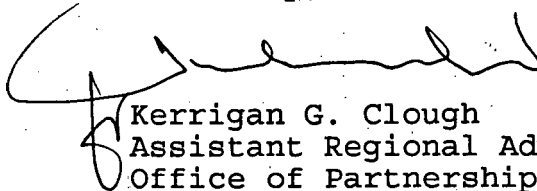
IS MODIFIED TO READ:

4. Injection Pressure Limitation.

- (b) The exact pressure limit may be **increased or decreased** by the Director in order to ensure that the requirements in paragraph (a) are fulfilled. In order to determine an exact pressure limit, the permittee shall conduct a step-rate injection test or other authorized well test(s) that will serve to determine the fracture pressure of the injection zone. Test procedures shall be pre-approved by the Director. The Director shall specify in writing, to the permittee, any increase or decrease to the injection pressure based on the test results and/or other parameters reflecting actual injection operations. Until such time that this demonstration is made, the initial maximum injection pressure (Pmax), measured at the surface, shall not exceed 1805 psig. For the commingled Phosphoria/Tensleep formations.

All other provisions and conditions of the Final Permit, dated November 18, 1997, for the referenced permit, shall remain as originally issued. If you have any questions on this action, contact Chuck Williams at 303.312.6625.

Sincerely,



Kerrigan G. Clough
Assistant Regional Administrator
Office of Partnerships and
Regulatory Assistance

cc: Mr. Ken Wallowingbull, Chairman
Northern Arapahoe Tribe
Arapahoe Business Council

Mr. John Washakie, Chairman
Eastern Shoshone Tribe
Shoshone Business Council

Mr. Don Aragon, Director
Wind River Environmental Quality Commission

Mrs. Janie Nelson
State of Wyoming
Oil & Gas Conservation Commission

U.S. Department of the Interior
BIA - Wind River Agency

Mr. Stu Cerovski
BLM - Lander Resource Area

P 380 306 149
3/23/99 CW 3484C

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Mr. R.P. Meabon
Regulatory Coordinator
Marathon Oil Company
1501 Stampede avenue
Cody, WY 82414-4721

4a. Article Number

P 380 306 149

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R P Meabon

6. Signature: (Addressee or Agent)

R P Meabon

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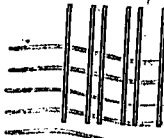
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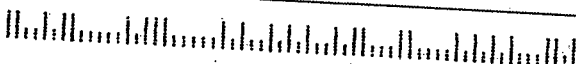
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VIII

999 18th STREET - SUITE 500
DENVER, COLORADO 80202-2466

JAN 12 2000

REF: 8P-W-GW

CERTIFIED MAIL

RETURN RECEIPT REQUESTED

Mr. Randy P. Meabon
Regulatory Coordinator
Marathon Oil Company
1501 Stampede Avenue
Cody, WY 82414-4721

RE: APPROVAL - Minor Permit
Modification; Tribal E-14,
UIC Permit No. WY2829-02131

Dear Mr. Meabon:

Your December 6, 1999, request for a minor modification of EPA UIC Permit No. WY2829-02131 to accommodate changes to the packer setting depth requirement has been reviewed and is approved pursuant to 40 CFR §144.41(f), based upon the conditions described in this letter. This approval becomes effective upon your receipt of this letter.

In your letter of December 6, 1999, you provided information that proposed changes to well construction for the Tribal E-14 include a dual packer assembly and modification of the packer setting depth. Due to unsuccessful cement squeeze work on existing Nugget Formation perforations, Marathon proposes to set two packers in order to straddle and isolate the Nugget perforations.

EPA has reviewed the proposed construction change and has determined it is protective of USDWs. The well construction change proposed by Marathon does not alter the ability to pressure test the mechanical integrity of the well over the interval from the ground surface down to the top of the approved injection zone. The approved injection zone for this well is the gross interval of the Nugget, Phosphoria and Tensleep Formations from 5260' to 6920'. The proposed top packer setting depth remains as described in the original permit at 5195', or 65' above the top perforation of the Nugget Formation at 5260' and within 100' of the top of the approved injection zone. The proposed additional lower packer is to be set at the depth of approximately 5420', below the Nugget Formation perforations and within the approved injection zone.



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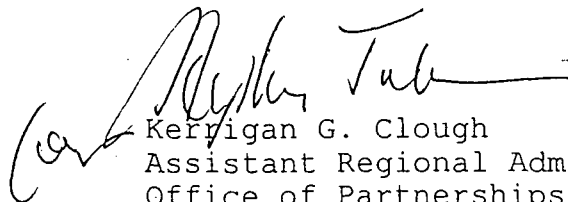
EPA approves modification of the injection well construction requirements for the Tribal E-14, EPA UIC Permit No. WY2829-02131 to allow for a dual packer assembly positioned to straddle and isolate the existing Nugget Formation perforations from 5260' to 5340'. The top packer shall be set at approximately 5195', the lower packer shall be set at approximately 5430'. The revised well completion schematic diagram submitted with your December 6, 1999, modification request will be labelled "Appendix A-2" and shall replace the original Appendix A of the original final permit. All other provisions and conditions of EPA UIC Permit No. WY2829-02131 as issued and/or modified remain in full effect.

Additionally, the original plugging and abandonment plan, Appendix C of the permit, required "cement squeeze the Nugget Formation perforations 5,260' - 5,340'." The Nugget Formation perforations from 5,260' to 5,340' were unsuccessfully cement squeezed in October of 1998. Therefore EPA is also modifying the original plugging and abandonment plan, labelled as Appendix C-2, and adding one additional Plug #2-A, as follows:

- 1) Plug #2 - Set CICR at 5200', pump 50 sacks cement, leave at least 2 sacks of cement on top of CICR. Displace wellbore with 9.2 ppg bentonite or plugging gel from top of cement to 4,260'.
- 2) Plug #2-A - Place a 150' plug extending from 4,260' to 4,090' across the Muddy Formation USDW. Displace wellbore with 9.2 ppg bentonite or plugging gel from top of cement to 2,800'.

If you have any questions regarding this action, please call Mr. Dan Jackson at (303) 312-6155.

Sincerely,



Kerrigan G. Clough
Assistant Regional Administrator
Office of Partnerships and
Regulatory Assistance

Attachments:

APPENDIX A-2
APPENDIX C-2

Enclosure:

Groundwater Program Guidance No. 40: Plugging and
Abandonment Requirements for Class II Injection Wells



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cc: Mr. Anthony Addison, Sr., Chairman
Northern Arapahoe Tribe
Arapahoe Business Council

Mr. John Washakie, Chairman
Eastern Shoshone Tribe
Shoshone Business Council

Mr. Don Aragon, Director
Wind River Environmental Quality Commission

Mrs. Janie Nelson,
Wyoming Oil and Gas conservation Commission

U.S. Department of the Interior
Bureau of Indian Affairs, Wind River Agency

Mr. Stu Cervoski
U.S. Department of the Interior
Bureau of Land Management, Lander Resource Area

→ Mr. Nathan Wiser, 8ENF-T

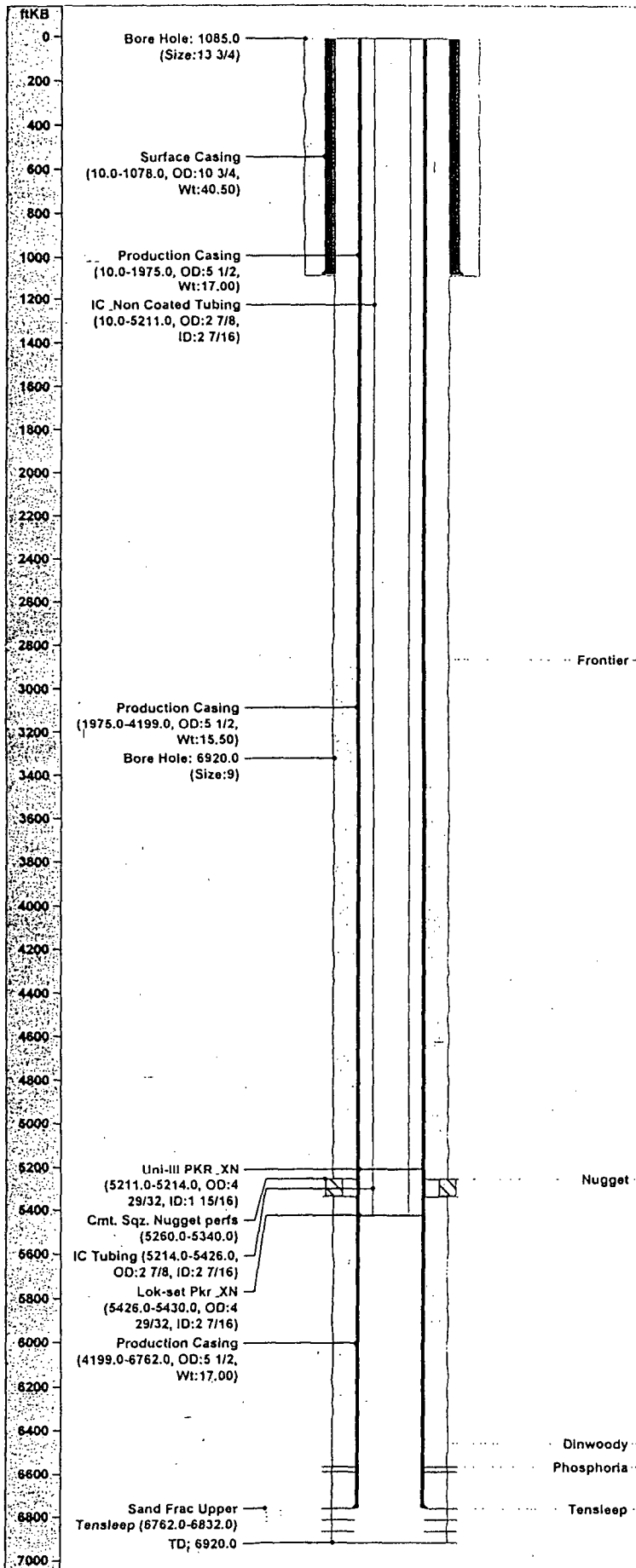
F:\MyFiles\WordPerfect\Marathon E-14 MinMod letter.wpd January 7, 2000



APPENDIX A-2
(Construction/Conversion Plans)

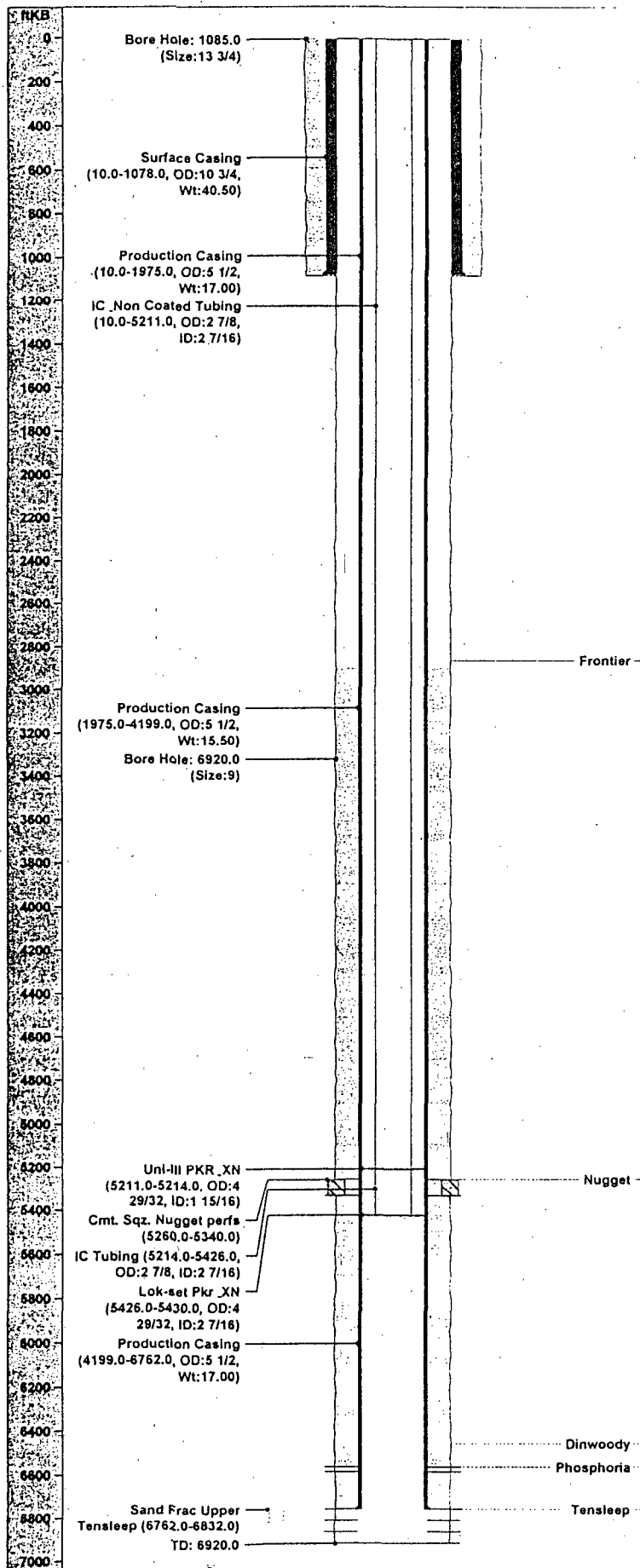
REVISED: January, 2000

MARATHON OIL COMPANY



Tribal E-14 (EPA #WY2829-02131)						
API Code	49-013-06373	Field Code	# 3231			
TD	6920.0 ftKB	Basin	Op.Prop.# 16838			
PBTD	6920.0 ftKB	Basin Code				
Operator	Marathon Oil Company	Permit				
State	Wyoming	Spud	11/25/47			
County	Fremont	Finish Dri	2/3/48			
Permit No.		Completion				
TD Measured		Abandon				
Reservoir	Phos/Ten					
Field	STEAMBOAT BUTTE					
Location						
Meridian	Wind River	Top Latitude	0			
Twnship	3 North	Top Longitude	0			
Range	1 West	Top NS Distance				
Section	330' FNL, 330' FEL Sec.8	Top EW Distance				
Quarter	NE NE Sec.8	Bottom Latitude	0			
		Bottom Longitude	0			
		Btm NS Distance				
		Btm EW Distance				
Elevations						
KB	5651.0 ft	Cas Fing				
Grd	5641.0 ft	Tub Head				
KB-Grd	10.0 ft					
Casing String - Surface Casing						
Item (in)	Btm (ftKB)	Jnts	ID	Wt	Grd	Thd
10 3/4 in Surface Casing	1078.0		10 3/64	40.50		
Casing String - Production Casing						
Item (in)	Btm (ftKB)	Jnts	ID	Wt	Grd	Thd
5 1/2 in Production Casing	1975.0	64	4 57/64	17.00		
5 1/2 in Production Casing	4199.0	72	4 61/64	15.50		
5 1/2 in Production Casing	6762.0	83	4 57/64	17.00		
Casing Cement						
Casing String	Top (ftKB)	Amount (sx)	Comments			
Surface Casing	10.0	700	Common			
Production Casing	2900.0	1000	OWS - CMT top from CBL			
Perforations						
Date	Int	Zone	Shots (/ft)	Type		
	5260.0 - 5340.0	Nugget	4.0	Squeezed		
	6567.0 - 6583.0	Phosphoria	2.0			
	6589.0 - 6596.0	Phosphoria	2.0			
	6762.0 - 6920.0	Tensleep	0.0	Open Hole		
Tubing String - Injection String						
Item (in)	Top (ftKB)	Len (ft)	Jnts	ID (in)	Wt	Grd Thd
2 7/8 in IC & Non Coated Tubing	10.0	5201.0	167	2 7/16	6.50	J55
4 29/32 in Uni-III PKR & XN	5211.0	3.0		1 15/16		
2 7/8 in IC Tubing	5214.0	212.0	7	2 7/16	6.50	J55
4 29/32 in Lok-set Pkr & XN	5426.0	4.0		2 7/16		
Stimulations & Treatments						
Date	Type	stm.user1	Int	stm.user2	Comments	
6/8/98	Cmt. Sqz. Nugget perms		5260.0 - 5340.0			
6/19/98	Sand Frac Upper Tensleep	31900#	6762.0 - 6832.0			
		20/40 sand				
Formation/Horizon Tops						
Top (ftKB)	TVD (ftKB)	Formation	Code	frm.user3	Source	
2866.0	0.0	Frontier				
5260.0	0.0	Nugget				
6460.0	0.0	Dinwoody				
6567.0	0.0	Phosphoria				
6762.0	0.0	Tensleep				
General Notes						
Date	Note					
11/4/99	Noticed backside pressure on well. Blew down casing and it would build back up to approximately 450 psi in 3-4 minutes. This pressure would also backflow into the vac truck. SHUT-IN WELL and Bahram Jafari of the EPA was notified of the condition.					

MARATHON OIL COMPANY



General Notes (con't)	
Date	Note
11/15/99	POH w/ injection equipment. Pressure tested tubing to 2000 psi, okay for 15 minutes. Pressure tested csg. to 1000 psi okay for 15 minutes. Confirmed no trouble with tubing or casing. Assumed packer rubbers were leaking.
11/17/99	RIH w/ injection equipment as above. Performed MIT okay to 1000 psi with George Baldes, Shoshone Tribal member present.

APPENDIX C-2

(Plugging and Abandonment Plan)

REVISED: January, 2000

Plug #1 - Cement squeeze the Phosphoria Formation perforations 6567'-6596' and the Tensleep Formation open hole 6762'-6920'. Set cast iron cement retainer (CICR) at 6500', pump 125 sacks cement, leaving at least 2 sacks of cement on top of CICR. Displace wellbore with 9.2 ppg bentonite or plugging gel from TOC to 5200 feet.

~~Plug #2 - Cement squeeze the Nugget Formation perforations 5260'-5340'. Set CICR at 5200', pump 50 sacks cement, leave at least 2 sacks of cement on top of CICR. Displace wellbore with 9.2 ppg bentonite or plugging gel from TOC to 2800 feet.~~

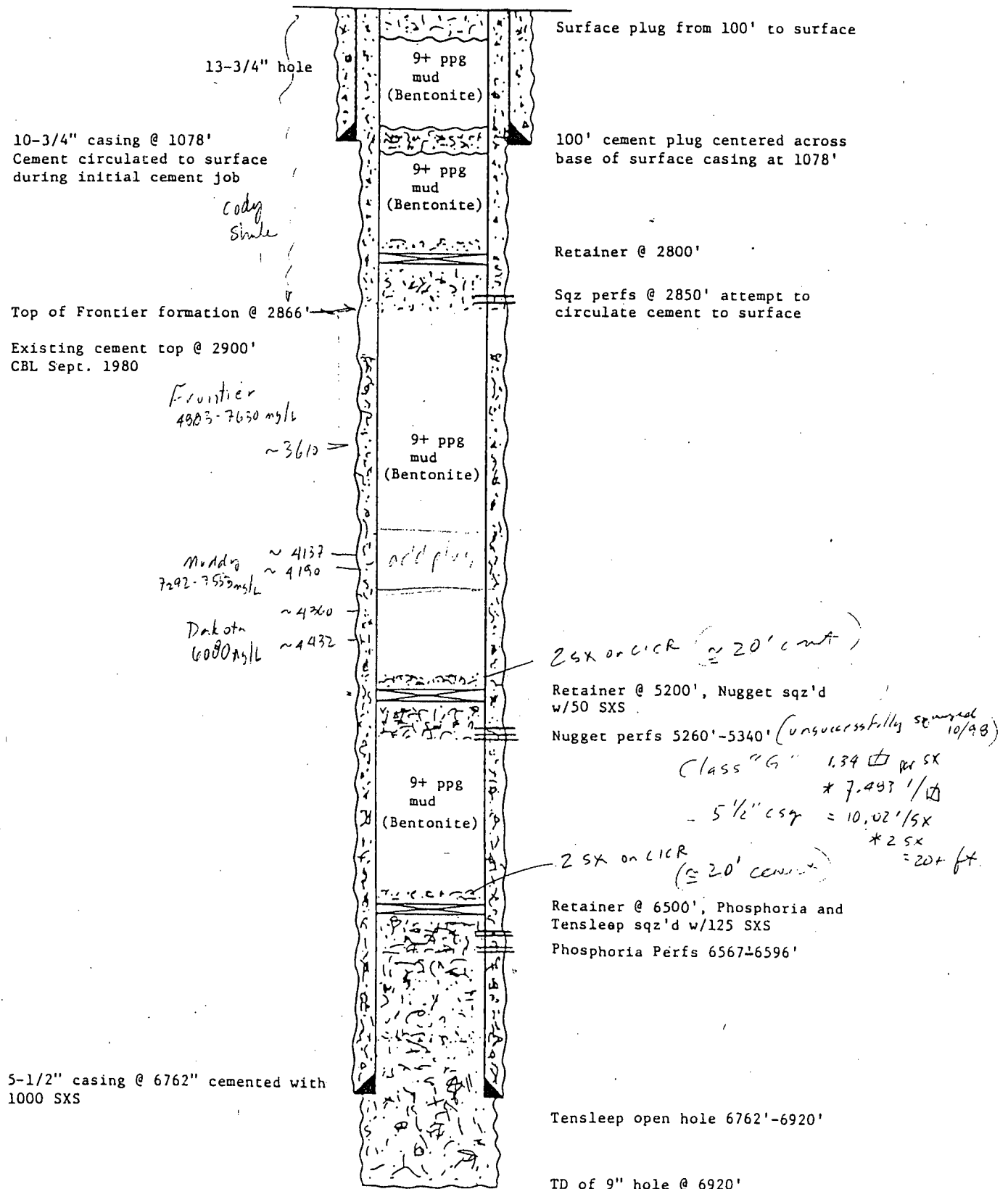
- 1) Plug #2 - Set CICR at 5200', pump 50 sacks cement, leave at least 2 sacks of cement on top of CICR. Displace wellbore with 9.2 ppg bentonite or plugging gel from top of cement to 4,260'.
- 2) Plug #2-A - Place a 150' plug extending from 4,260' to 4,090' across the Muddy Formation USDW. Displace wellbore with 9.2 ppg bentonite or plugging gel from top of cement to 2,800'.

Plug #3 - Perforate the 5-1/2 casing at 2850. Cement squeeze the perforations at 2850', set CICR at 2800', pump 790 sacks cement, and attempt to circulate cement to surface inside 5-1/2" X 10-3/4" casing annulus, leaving at least 2 sacks of cement on top of CICR. Displace wellbore with 9.2 ppg bentonite or plugging gel from TOC to 2800'.

Plug #4 - Place 100' plug inside 5-1/2" casing from 1028' to 1128'. Displace wellbore with 9.2 ppg bentonite or plugging gel from TOC to 100'.

Plug #5 - Place 100' cement plug inside the 5-1/2" casing from 100' to the surface. Set P&A marker and restore location.

PLUGGING AND ABANDONMENT DETAIL





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VIII

999 18th STREET - SUITE 600
DENVER, COLORADO 80202-2466

JUN 9 1998

SUBJECT: GROUNDWATER PROGRAM GUIDANCE NO. 40: Plugging and
Abandonment Requirements For Class II Injection Wells

FROM: D. Edwin Hogle, Director
Groundwater Program
Office of Pollution Prevention,
State and Tribal Assistance

Sharon L. Kercher, Director
Technical Enforcement Program
Office of Enforcement, Compliance
and Environmental Justice

TO: EPA Region VIII and Montana Operations Office
Underground Injection Control (UIC) Program Staff

Region VIII Class II Well Operators

I. Introduction

The Environmental Protection Agency (EPA) injection well plugging and abandonment (P&A) requirements focus on protection of underground sources of drinking water (USDW), and are required to assure the prevention of movement of fluids into or between USDWs after an injection well has served its useful life.

Injection well plugging and abandonment (P&A) requirements are found in the Code of Federal Regulations (CFR) at Title 40 (40 CFR) Parts 144.28(c)(iii), 144.51(p) and 146.10. All Class II injection wells are required to be plugged with cement. Other local, state, tribal, and federal agencies may require additional plugs to address other objectives such as those listed below. It is the operator's responsibility to be aware of all required plugs and include them in the P&A plan.

1. Protect surface soils and surface waters from contamination by formation fluid migration to the surface;
2. Isolate oil, gas, or mineral-bearing formations;
3. Isolate well problems (junk, split casing, etc.);
4. Isolate casing shoes, or casing stubs;
5. Isolate injection/disposal/production intervals;

This document provides guidance to EPA Region VIII (the Region) and States exercising primary enforcement responsibility under the Safe Drinking Water Act (SDWA) concerning how the Region interprets requirements for Class II injection well plugging and abandonment plans. It also provides guidance to the

public and regulated community about how the Region intends to exercise its discretion in implementing those regulations. It does not substitute for the SDWA or EPA's regulations, nor is it a regulation itself, thus it cannot impose legally binding requirements on the EPA, States, or the regulated community. EPA and State decision makers retain their discretion to vary from this guidance on a case-by-case basis where appropriate. EPA may change this guidance in the future. Attachment A provides guidance on plugging methods and technical considerations. Related requirements for demonstrating financial responsibility are discussed in GROUNDWATER PROGRAM GUIDANCE NO. 41.

II. Terms

An **Underground Source Of Drinking Water (USDW)** is defined as an aquifer or its portion: a) which supplies any public water system; or which contains a sufficient quantity of ground water to supply a public water system; and (i) currently supplies drinking water for human consumption; or (ii) contains fewer than 10,000 mg/l **Total Dissolved Solids (TDS)**; and b) which is not an exempted aquifer (see 40 CFR 146.3).

Confining zones are those geologic formations, or parts of formations, which provide an effective barrier to the migration of fluids above, between and below USDWs and other fluid bearing geologic formations (see 40 CFR 146.3).

III. Requirements For A P&A Plan

The applicant is required to provide a signed and completed **EPA Form 7520-14 PLUGGING AND ABANDONMENT PLAN**. EPA Form 7520-14 requires the following information about the proposed plugging plan, in addition to well classification and location information:

- casing and tubing record after plugging
- cementing to plug and abandon data for each plug
- method of emplacement of cement plug(s)
- list of all open hole and perforated intervals and intervals where casing will be varied
- estimated cost to plug well(s)

Additional information, such as well construction and modification details, geologic data, and other information, is necessary to develop a P&A plan, also may be required by Region VIII to evaluate whether the proposed plugging plan is adequate to protect all USDWs. The following information generally is

part of a UIC permit application and should be included for evaluation of the proposed plugging plan:

- all Well Completion and Sundry Notice Reports;
- the daily drilling log (through completion);
- cased and open hole logs with log headers;
- a brief narrative description of the plugging and abandonment procedures; and
- a schematic diagram of each of the following:
 - 1) Existing Well Configuration, that shows hole size, all surface, intermediate and long string casing(s), depth to top of cement and how determined, depth of all perforated intervals, and depth of intervals of all well repairs and cement "squeezes." The schematic should show and identify by formation name and the top and bottom depth for each:
 - water-bearing zone (show TDS of zone),
 - confining zone, and
 - hydrocarbon-bearing zone.
 - 2) Proposed Well Configuration after Plugging and Abandonment, that shows hole size, all surface, intermediate and long string casing(s), the placement of any and all bridge plugs, all repairs and/or cement "squeezes", any unusual conditions (e.g. 'junk' in hole, etc.), all retainers and cement plugs, all perforations, and a description of the fluid to remain between plugs. The schematic should show and identify by formation name and the top and bottom depth for each:
 - water-bearing zone (show TDS of zone),
 - confining zone, and
 - hydrocarbon-bearing zone.

Well construction documentation provided must identify hole size and strings of casing by size, weight, and setting depth. Cement information should describe the number of sacks to be used and the type of cement. The complete cement bond log (CBL) should be provided when available. At a minimum, provide a continuous CBL that covers the interval beginning with a section of free pipe directly above the top of cement and continues unbroken downward through the cemented interval to total depth, and include the 'log header' record of all logging parameters.

3) Methods and Information Sources for TDS:

Some methods for obtaining TDS values commonly accepted by Region VIII are listed below. Alternate methods and sources of information may be accepted upon approval.

- Open hole log analyses.

- Water analyses of samples recovered from "swab" tests.
- Drill stem test (DST) water recovery analyses generally are not acceptable unless it can be shown that the water in the chamber was not contaminated by drilling or other fluids.
- Produced water analyses from nearby wells

IV. Post-Plugging and Abandonment Reporting Requirements

Notification of EPA is required prior to conversion or abandonment of a well [see 40 CFR 144.28(j)]. Within sixty (60) days after the plugging and abandonment of a well, the owner or operator must submit a Plugging Record (EPA Form 7520-13) to the Regional Administrator through the Region VIII UIC Program office at Mail Code 8ENF-T-UIC. The Plugging Record must be certified as accurate and complete by the person who performed the plugging operation [see 40 CFR 144.28(k)].

All well work records (wellbore clean outs, tubing movements, casing repair work, plug setting records, pipe tallies, etc.), procedures used, and rig operation reports should be documented and maintained by the operator in a permanent well file, and copies supplied to EPA and other appropriate regulatory agencies as required. Permits and other authorization documents also should be preserved in the operator's permanent file. The operator that plugged the well should preserve the permanent file as the operator of record. If the well property is acquired by another operator, that operator should assume responsibility for preserving the permanent well file and become the operator of record. If the operator of record ceases doing business and no other survivor assumes responsibility for the permanent well files, the operator should send the permanent well files to the appropriate regulatory agency as custodian.

V. P&A Plans and Financial Responsibility

UIC regulations require an adequate demonstration of financial responsibility for plugging and abandoning an injection well (bonding). The approved P&A plan provides a basis on which to determine the amount of bonding required, and reflects the cost that the EPA would incur if required to plug the well. GROUNDWATER PROGRAM GUIDANCE NO. 41 discusses Region VIII requirements for financial responsibility. Failure to provide a complete P&A plan and/or failure to establish an acceptable demonstration of financial responsibility may result in UIC permit application denial or enforcement action.

After completion of the plugging and abandonment and submittal of the Plugging Record (EPA Form 7520-13), the

demonstration of financial responsibility previously established with the EPA by means of a Surety Bond, Trust Fund, or Letter of Credit may be released to the operator, or may be applied to update the operator's financial responsibility coverage.

Attachments:

- Attachment A - *Plugging Methods and Technical Considerations*
- EPA Form 7520-7 Application to Transfer Permit
- EPA Form 7520-12 Well Rework Record
- EPA Form 7520-13 Plugging Record
- EPA Form 7520-14 Plugging and Abandonment Plan

ATTACHMENT A

Region VIII Guidance PLUGGING METHODS AND TECHNICAL CONSIDERATIONS

Plugging and abandonment operations commence in the lowermost interval and proceed sequentially up the wellbore to the surface. Discussions of plug placement techniques and cementing materials are available in the SPE Monograph, Cementing, edited by Dwight K. Smith and Well Cementing, edited by Erik B. Nelson.

A. Plug Placement Considerations

EPA's key objective for injection well abandonment is to protect all USDWs [see 40 CFR 146.10]. Uncemented longstring casing intervals frequently exist in older wells, and exposed critical intervals may be required to be isolated by placing cement behind pipe. Uncased (exposed) intervals also may occur when the longstring casing is cut and pulled during abandonment operations, and other agencies may require that the remaining casing 'stub' is sealed off before isolating other zones uphole. Critical intervals, such as USDWs, water-bearing zones, hydrocarbon-bearing zones, and confining zones may require separate plugs to adequately isolate and protect all USDWs.

Region VIII may require isolation of USDW's where there is more than 2,000 mg/liter difference of TDS between individual exposed USDWs. In a case where all USDWs are within 2,000 mg/l TDS of each other, isolation may be accomplished by setting a plug at the base of the lowermost USDW. A surface plug of at least 50 feet must be set inside and outside of the casing, to prevent surface water runoff from entering the plugged and abandoned wellbore and to seal all possible pathways for fluid migration into the subsurface via the well.

B. Plug Length and Coverage Considerations

Cement plugs must extend at least 50 feet above and below each zone being isolated. In some cases, for example where a zone is greater than 100 feet thick, placing a minimum 100 feet plug at the top and base of the interval may be adequate (rather than cementing across the entire geologic horizon). The volume of cement to be used for adequate plug coverage should be calculated using the desired plug length, the casing diameter, the hole diameter based on caliper logs, and must include allowances for cement contamination by wellbore fluids or cementing spacers and any unusual wellbore conditions.

C. Cement Type and Well Fluid Considerations

The wellbore fluid should be at static equilibrium prior to cement plug placement operations. Control measures such as spotting viscous high density mud pills, pumping lost circulation material, or other methods may be necessary to achieve static equilibrium. Water-based muds, or brines containing a plugging gel, with a density of at least 9.2 lb/gal should be used during plugging operations, and should remain between plugs in the well after cement plug placement.

Class A, C, G, or H cements typically are used in well plugging operations. The selection of cement for plugging depends on the well depth, formation temperatures, formation properties, and wellbore mud properties. Cement additives such as accelerators and retarders may be added to enhance or control the properties of the cement slurry, however, volume-extending additives and 'gel' cements must not be used for cement plugs.

D. Plug Placement Objectives and Methods

PART 1 - ISOLATING THE INJECTION ZONE:

Several methods may be employed to isolate the injection zone from the rest of the wellbore. These include:

For Open Hole Completions:

Using a cement retainer. The injection zone may be isolated by setting a cement retainer 50-100 feet above the casing shoe and squeezing cement below the retainer. The amount of cement used must be adequate to fill both the casing and the open hole interval to at least 50 feet above the casing shoe. At least 20 feet of cement also should be left on top of the retainer.

Using a Cast Iron Bridge Plug (CIBP). A CIBP set 50-100 feet above the casing shoe may effectively isolate the open-hole interval. At least 20 feet of cement also should be left on top of the bridge plug.

Setting a Balanced Plug. The balanced plug method involves pumping cement slurry through drill pipe, coiled tubing, work string, or production tubing until the level of cement outside is equal to that inside the drill pipe/tubing string. The pipe then is pulled slowly from the slurry, leaving behind the cement plug. To minimize cement contamination by wellbore fluids, fluid spacers should be used both ahead of and behind the slurry, especially if the wellbore fluid is incompatible with the cement slurry. Plug

placement must be verified by tagging the top of the plug after the cement has had adequate time to set. If a bridge plug is used at the base of the cement plug, tagging the top of the plug is not necessary.

For Cased Hole Completions

Using a cement retainer. The injection zone may be isolated by setting a cement retainer 50-100 feet above the injection perforations and squeezing cement below the retainer. The amount of cement used must be adequate to fill the casing between the retainer and the perforations, and should allow for some extra cement to be squeezed into the perforations. At least 20 feet of cement also should be left on top of the retainer.

Using a Cast Iron Bridge Plug (CIBP). A CIBP set 50-100 feet above the top injection perforation may effectively isolate the injection interval. At least 20 feet of cement should also be left on top of the bridge plug.

Setting a Balanced Plug. The balanced plug method involves pumping cement slurry through drill pipe, coiled tubing, work string, or production tubing until the level of cement outside is equal to that inside the drill pipe/tubing string. The pipe then is pulled slowly from the slurry, leaving behind the cement plug. To minimize cement contamination by wellbore fluids, fluid spacers should be used both ahead of and behind the slurry, especially if the wellbore fluid is incompatible with the cement slurry. Plug placement must be verified by tagging the top of the plug after the cement has had adequate time to set. If a bridge plug is used at the base of the balanced plug, tagging the top of the plug is not necessary.

PART 2 - ISOLATING UP-HOLE ZONES:

Several methods may be employed to isolate up-hole zones from the remainder of the wellbore. These include:

For Uncased (Open Hole) Intervals

Setting a Balanced Plug. The balanced plug method involves pumping cement slurry through drill pipe, coiled tubing, work string, or production tubing until the level of cement outside is equal to that inside the drill pipe/tubing string. The pipe then is pulled slowly from the slurry, leaving behind the cement plug. To minimize cement contamination by wellbore fluids, fluid spacers should be used both ahead of and behind the slurry, especially if the

wellbore fluid is incompatible with the cement slurry. Plug placement must be verified by tagging the top of the plug after the cement has had adequate time to set.

Using a Dump Bailer. The dump bailer containing a measured quantity of cement is lowered into the well on wireline. The bailer opens by electrical activation. Because cement contamination can occur when setting plugs with a dump bailer, use of this method is discouraged. If this method is chosen, the operator may be required to take additional special measures to ensure the quality of the cement plug. These measures may vary depending on site-specific conditions, and may add considerable time to the plugging operation and approval. Dump-bailed plug placement must be verified by tagging the top of the plug after the cement has had adequate time to set.

For Uncemented Cased Hole Intervals

Cement Squeeze Method. The cement squeeze method often is used to isolate intervals where uncemented casing exists through the interval to be plugged. This method requires that the casing be perforated and cement forced through these perforations into the space between the casing and the formation face. Several methods may be employed for squeeze cementing, but the method that assures the most accurate placement of cement is the **block squeeze**. Normally, a block squeeze involves two sets of perforations; one at the base of the interval to be cemented, and the other set of perforations at the top of the interval. Usually a cement retainer is set immediately above the lower set of perforations, and cement is pumped through the retainer via the tubing or workstring. As cement passes through the retainer, it is forced out the lower set of perforations and upward through the casing/open-hole annulus. Fluid returns are taken through the top set of perforations, allowing mud and cement to flow back into the casing. Evidence of a good cement job can be seen when cement is circulated out of the casing. After cement has been squeezed behind casing, the inside of the casing can be cemented by leaving cement on top of the retainer. When used in conjunction with a cement retainer, a plug set in this manner does not require tagging.

For Cemented Cased Hole Intervals

Setting a Balanced Plug. The balanced plug method involves pumping cement slurry through drill pipe, coiled tubing, work string, or production tubing until the level of cement outside is equal to that inside the drill pipe/tubing string. The pipe then is pulled slowly from the slurry,

leaving behind the cement plug. To minimize cement contamination by wellbore fluids, fluid spacers should be used both ahead of and behind the slurry, especially if the wellbore fluid is incompatible with the cement slurry. Plug placement must be verified by tagging the top of the plug after the cement has had adequate time to set. If a bridge plug is used at the base of the cement plug, tagging the top of the plug is not necessary.

Using a Dump Bailer. The dump bailer containing a measured quantity of cement is lowered into the well on wireline. The bailer opens upon impact (i.e., striking the bridge plug, cement retainer, etc.) or by electrical activation. Typically, the dump bailer method is used for placing cement on top of mechanical plugs such as a cement retainer or cast iron bridge plug. Unless used in conjunction with a cement retainer or bridge plug, plug placement must be verified by tagging the top of the plug after the cement has had adequate time to set.

Other Methods:

Special abandonment procedures may be necessary for wells with unusual surface or downhole conditions. Procedures for such wellbore conditions are considered beyond the scope of this document. Operators must address fluid migration potential associated with the unusual conditions in their plugging programs and assure that USDWs are protected. If special procedures are needed, the operator must develop procedures and receive written approval from EPA prior to initiating the plugging operation.



United States Environmental Protection Agency
Washington, DC 20460

Application To Transfer Permit

Name and Address of Existing Permittee		Name and Address of Surface Owner																																																	
<p>Locate Well and Outline Unit on Section Plat- 640 Acres</p> <div style="text-align: center;">N</div> <table border="1" style="width: 100%; height: 150px; border-collapse: collapse;"> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table> <div style="text-align: center;">S</div> <div style="position: absolute; left: -20px; top: 50%; transform: translateY(-50%);">W</div> <div style="position: absolute; right: -20px; top: 50%; transform: translateY(-50%);">E</div>																																																	State	County	Permit Number
<p>Surface Location Description</p> <p>___ 1/4 of ___ 1/4 of ___ 1/4 of ___ 1/4 of Section ___ Township ___ Range ___</p>																																																			
<p>Locate well in two directions from nearest lines of quarter section and drilling unit</p>																																																			
<p>Surface Location ___ ft. from (N/S) ___ Line of quarter section and ___ ft. from (E/W) ___ Line of quarter section.</p>																																																			
<p>Well Activity</p> <p>___ Class I</p> <p>___ Class II</p> <p>___ Brine Disposal</p> <p>___ Enhanced Recovery</p> <p>___ Hydrocarbon Storage</p> <p>___ Class III</p> <p>___ Other</p>		<p>Well Status</p> <p>___ Operating</p> <p>___ Modification/Conversion</p> <p>___ Proposed</p>																																																	
<p>Lease Number</p>		<p>Well Number</p>																																																	
Name(s) and Address(es) of New Owners(s)		Name and Address of New Operator																																																	
<p>Attach to this application a written agreement between the existing and new permittee containing a specific date for transfer of permit responsibility, coverage, and liability between them.</p> <p>The new permittee must show evidence of financial responsibility by the submission of a surety bond, or other adequate assurance, such as financial statements or other materials acceptable to the Director.</p>																																																			
<h3>Certification</h3>																																																			
<p>I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)</p>																																																			
Name and Official Title (Please type or print)		Signature	Date Signed																																																

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC 20460

WELL REWORK RECORD

NAME AND ADDRESS OF PERMITTEE				NAME AND ADDRESS OF CONTRACTOR																																																																		
<p align="center">LOCATE WELL AND OUTLINE UNIT ON SECTION PLAT — 640 ACRES</p> <div style="text-align: center; margin-bottom: 5px;">N</div> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table> <div style="display: flex; justify-content: space-between; width: 100%;"> W E </div>																																																																				STATE	COUNTY	PERMIT NUMBER
SURFACE LOCATION DESCRIPTION _____ 1/4 of _____ 1/4 of _____ 1/4 of _____ Section _____ Township _____ Range _____																																																																						
LOCATE WELL IN TWO DIRECTIONS FROM NEAREST LINES OF QUARTER SECTION AND DRILLING UNIT Surface Location _____ ft. from (N/S) _____ Line of quarter section and _____ ft. from (E/W) _____ Line of quarter section																																																																						
WELL ACTIVITY <input type="checkbox"/> Brine Disposal <input type="checkbox"/> Enhanced Recovery <input type="checkbox"/> Hydrocarbon Storage Lease Name _____		Total Depth Before Rework _____ Total Depth After Rework _____ Date Rework Commenced _____ Date Rework Completed _____	TYPE OF PERMIT <input type="checkbox"/> Individual <input type="checkbox"/> Area Number of Wells _____ Well Number _____																																																																			

WELL CASING RECORD — BEFORE REWORK

[illegible]

WELL CASING RECORD — AFTER REWORK (Indicate Additions and Changes Only)

[illegible]

DESCRIBE REWORK OPERATIONS IN DETAIL USE ADDITIONAL SHEETS IF NECESSARY	WIRE LINE LOGS. LIST EACH TYPE	
	Log Types	Logged Intervals

CERTIFICATION

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32).

NAME AND OFFICIAL TITLE (Please type or print)	SIGNATURE	DATE SIGNED


 UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
 WASHINGTON, DC 20460

PLUGGING AND ABANDONMENT PLAN

NAME AND ADDRESS OF FACILITY

NAME AND ADDRESS OF OWNER/OPERATOR

 LOCATE WELL AND OUTLINE UNIT ON
 SECTION PLAT — 640 ACRES

STATE

COUNTY

PERMIT NUMBER

SURFACE LOCATION DESCRIPTION

1/4 of 1/4 of 1/4 of 1/4 of Section Township Range

LOCATE WELL IN TWO DIRECTIONS FROM NEAREST LINES OF QUARTER SECTION AND DRILLING UNIT

Surface

Location ft. from (N/S) Line of quarter section

and ft. from (E/W) Line of quarter section

TYPE OF AUTHORIZATION

- ☐ Individual Permit
☐ Area Permit
☐ Rule

Number of Wells

Lease Name

WELL ACTIVITY

- ☐ CLASS I
☐ CLASS II
☐ Brine Disposal
☐ Enhanced Recovery
☐ Hydrocarbon Storage
☐ CLASS III

Well Number

CASING AND TUBING RECORD AFTER PLUGGING

METHOD OF EMPLACEMENT OF CEMENT PLUGS

- ☐ The Balance Method
☐ The Dump Bailer Method
☐ The Two-Plug Method
☐ Other

SIZE	WT(LB/FT)	TO BE PUT IN WELL (FT)	TO BE LEFT IN WELL (FT)	HOLE SIZE

CEMENTING TO PLUG AND ABANDON DATA:

	PLUG #1	PLUG #2	PLUG #3	PLUG #4	PLUG #5	PLUG #6	PLUG #7
Size of Hole or Pipe in which Plug Will Be Placed (inches)							
Depth to Bottom of Tubing or Drill Pipe (ft.)							
Sacks of Cement To Be Used (each plug)							
Slurry Volume To Be Pumped (cu. ft.)							
Calculated Top of Plug (ft.)							
Measured Top of Plug (if tagged ft.)							
Slurry Wt. (Lb./Gal.)							
Type Cement or Other Material (Class III)							

LIST ALL OPEN HOLE AND/OR PERFORATED INTERVALS AND INTERVALS WHERE CASING WILL BE VARIED (If any)

From	To	From	To

Estimated Cost to Plug Wells

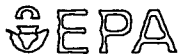
CERTIFICATION

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NAME AND OFFICIAL TITLE (Please type or print)

SIGNATURE

DATE SIGNED



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC 20460

PLUGGING RECORD

NAME AND ADDRESS OF PERMITTEE

NAME AND ADDRESS OF CEMENTING COMPANY

LOCATE WELL AND OUTLINE UNIT ON
SECTION PLAT — 640 ACRES

N					
S					

W E

STATE

COUNTY

PERMIT NUMBER

SURFACE LOCATION DESCRIPTION

1/4 OF

1/4 OF

1/4 SECTION

TOWNSHIP

RANGE

LOCATE WELL IN TWO DIRECTIONS FROM NEAREST LINES OF QUARTER SECTION AND DRILLING UNIT

Surface

Location ____ ft. from (N/S) ____ Line of quarter section

and ____ ft. from (E/W) ____ Line of quarter section

TYPE OF AUTHORIZATION

- ☐ Individual Permit
☐ Area Permit
☐ Rule

Number of Wells ____

Lease Name

Describe in detail the manner in which the fluid was placed in the casing used in interpreting it into the hole

CASING AND TUBING RECORD AFTER PLUGGING

SIZE	WT/LB/FT	TO BE PUT IN WELL (FT)	TO BE LEFT IN WELL (FT)	HOLE SIZE

WELL ACTIVITY

- ☐ CLASS I
☐ CLASS II
☐ Brine Disposal
☐ Enhanced Recovery
☐ Hydrocarbon Storage
☐ CLASS III

METHOD OF EMPLACEMENT OF CEMENT PLUGS

- ☐ The Balance Method
☐ The Dump Box Method
☐ The Two-Plug Method
☐ Other

CEMENTING TO PLUG AND ABANDON DATA:

	PLUG #1	PLUG #2	PLUG #3	PLUG #4	PLUG #5	PLUG #6	PLUG #7
Hole or Pipe in which Plug Will Be Placed (inches)							
From to Bottom of Tubing or Drill Pipe (ft.)							
Scale of Cement To Be Used (each plug)							
Slurry Volume To Be Pumped (cu. ft.)							
Calculated Top of Plug (ft.)							
Measured Top of Plug (if tagged ft.)							
Slurry Wt. (Lb./Gal.)							
Type of Cement or Other Material (Class III)							

LIST ALL OPEN HOLE AND/OR PERFORATED INTERVALS

From	To	From	To

Signature of Cementer or Authorized Representative

Signature of EPA Representative

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.
(REF. 40 CFR 122.22)

NAME AND OFFICIAL TITLE (Please type or print)

SIGNATURE

DATE SIGNED